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and supports his main contentions with statistical data. The significance of the Siemens-Martin process of steel manufacture for the increasing use of scrap material is discussed. The capital necessary to this process is shown to be relatively small—a matter of some importance in connection with the growth of trusts and cartels. Some interesting observations are made regarding the significance of the use of scrap in countries consuming large quantities of iron and steel but having limited ore and coal deposits. Such countries have a large stock of scrap, and this material will in the future help to give them greater economic independence.

ABRAHAM BERGLUND.

Washington, D. C.

NEW BOOKS

VON ALTROCK, W. *Beiträge zur Statistik der Milchwirtschaft der Industrie der Speisefettfabrikation.* (Berlin: Verlag des Deutschen Michwirtschaftlichen Vereins. 1912. Pp. iv, 172. 3.75 m.)

KNAGGS, H. V. *The truth about sugar.* (London: C. W. Daniel. 1913. 1s.)

MACFARLANE, J. J. *Manufacturing in Philadelphia, 1683-1912.* (Philadelphia: Commercial Museum. 1912. Pp. 101, illus. 50c.)

MORPURGO, G. *L'importanza economica della sintesi chimica.* (Triest: La Scuola di Fondazione Revoltella. 1912.)

Deals in an elementary and interesting fashion with the history of chemical synthesis and the nature, variety, and economic importance of synthetic products. The recent annual production of artificial indigo in Germany is given as equivalent to what could be produced on 150,000 acres of land.

WALTON, P. *The story of textiles; a bird's-eye view of the history, of the beginning and the growth of the industry by which mankind is clothed.* (Boston: John S. Lawrence. 1912. Pp. 274, illus.)

WOOD, T. B. *The story of a loaf of bread.* Cambridge manuals of science and literature. (New York: Putnam. 1913.)

— *An encyclopaedia of industrialism.* (London: Nelson. 1913. Pp. 543. 1s.)

Transportation and Communication

Freight Classification. A Study of Underlying Principles. By J. F. STROMBECK. Hart Schaffner & Marx Prize Essays, XII. (Boston: Houghton Mifflin Company. 1912. Pp. 131. \$1.00.)

Mr. Strombeck has written a lucid, interesting and instructive book, which will be valuable as a text in railroad courses in the

universities. He tells with technical knowledge and accuracy, but in simple, non-technical language, the way railway freight classifications are made and the factors that determine the classes into which commodities are put. He illustrates and supports his points with full references to the practice of railways, to statements made and testimony given by railway officers, to opinions of the Interstate Commerce Commission, and to decisions of the courts. He apparently accords reasonable weight to cost of service and value of service as factors in classification and to the various elements entering into them.

The most original part of his work is his discussion of the "indirect" or "constant" and the "direct" or "variable" costs of transportation, and the conclusions that he reaches as to the way classifications and rates should be adjusted with reference to these costs. He argues that, while the direct costs of hauling commodities increase with the increase in the dead weight that must be hauled in connection with their transportation, the indirect costs do not so increase. He, therefore, concludes that the part of the rate covering indirect costs should not vary with the amount of dead weight that has to be hauled. Besides the weight of the car, he includes in dead-weight dunnage, ice and preservatives in refrigerator cars, and carriers such as barrels and other containers.

I do not think it is true that the indirect costs are not affected by the amount of dead weight carried. Let us take the best example, the weight of the car itself. The main reason why the capacity of freight cars has been increased is that more freight can be carried in a large car in proportion to its weight. (1) The investment in cars required to handle a given amount of freight in large carloads is less than the investment required to handle it in small carloads. (2) The more tons there are loaded per car, the more tons there are hauled in a train containing a given number of cars; the more tons there are hauled per train, the fewer trains it is necessary to run to handle a given ton mileage; and the fewer trains it is necessary to run, the less engines it is necessary to invest in. (3) The fewer trains it is necessary to run to handle a given ton mileage, the less tracks it is necessary to provide, and the less investment it is necessary to make in tracks. Of course, the less investment it is necessary to make in equipment and tracks, the less fixed charges are. It follows that the indirect costs per ton mile, as well as the

direct costs, are reduced when the average capacity of cars and the average carload are increased; and vice versa. As the hauling of dead weight does increase the indirect as well as the direct costs, it follows that, contrary to Mr. Strombeck's theory, the part of the rate covering the indirect costs also should increase with the dead weight. I prefer the terms "divisible" and "indivisible" to the terms "direct" and "indirect" or "variable" and "constant." It does not follow because a large part of the total costs are mathematically indivisible that they are also constant for each unit of traffic. In spite of Mr. Strombeck's argument to the contrary I believe that the gross tonnage it is necessary to haul to move a given tonnage of freight is the best unit available on which to compute the total cost of moving the freight.

SAMUEL O. DUNN.

Railway Age Gazette.

How to Analyze Railroad Reports. By JOHN MOODY. (New York: Analyses Publishing Company, 1912. Pp. 224. \$2.50.)

The only way to acquire a real knowledge of how to analyze annual reports of railroad companies is to read the reports themselves. These reports are written in a certain language and it is as impossible to learn to read and make an analysis of a railroad report by only studying a textbook on the subject, as it is to learn to read German by only studying a German grammar. Mr. Moody's little book must be considered, therefore, as a popular and quite simply written help in learning the language of railroad annual reports. After outlining briefly the problems that are met in making an investment in railroad securities, based on personal investigation of the subject, Mr. Moody describes first the physical factors of the railroad; second, the income factors; and third, the capitalization factors. Room is given for only a very superficial discussion of a great many of the points that are to be considered in making an analysis of a road's earning power and of its securities as safe or profitable investments.

There is a great deal contained in this little book that the general public who, without hesitation discuss railroad problems, have not even the faintest idea of. On the other hand, there is nothing in the book that one who has made any study of railroad securities as investments does not already know. The